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(73) Proprietor: **DSM N.V.**
Het Overloon 1
NL-6411 TE Heerlen (NL)

(72) Inventor: **Pons, Dick Adriaan**
Fazantstraat 55
NL-3145 CA Maassizis (NL)
Inventor: **van der Heyden-van den Berg, Monique**
Lakemanstraat 22
NL-3151 RL Hoek va Holland (NL)

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Description

The invention relates to the use of a plastic dispersion as coating for inorganic and organic particles, such as pigment particles and colourant particles.

The use of plastic dispersions as coatings for inorganic and organic particles, such as pigment particles and colourant particles, is described on page 165 of the Pigment Handbook (Volume III, by Temple C. Patton, 1973). Such pigment particles or colourant particles coated with plastic dispersions can be mixed into various plastics. After mixing with plastics, such coated pigment particles often cause problems owing to the formation of agglomerates. In general the coated pigment particles are suited only for mixing with highly specific plastics. This factor explains why plastic dispersions are sought resulting in a good homogeneous distribution of pigments and colourants in a plurality of plastics without agglomerates being formed.

The invention is characterized in that the plastic dispersion is a dispersion of a polymer based on

a. a vinyl monomer,

b. (C_1-C_{12}) alkyl (meth)acrylate, (C_1-C_{12}) dialkylitaconate, (C_1-C_{12}) dialkylfumarate and/or (C_1-C_{12}) dialkylmaleate,

c. a phosphorus-containing compound according to one of the formulas $(RO)_2PO(OH)$ and/or $(RO)PO(OH)_2$, wherein R represents an alcohol residue derived from an unsaturated polymerizable alcohol with 2-12 carbon atoms or wherein R represents a group A-B, where A represents a residual acid derived from an unsaturated polymerizable carboxylic acid with 3-25 carbon atoms from the group consisting of acrylic acid, methacrylic acid, crotonic acid, monoesterified fumaric acid, monoesterified maleic acid and monoesterified itaconic acid and where B represents a bivalent residue derived from a diol and/or a phosphorus-containing compound according to the formula (RO)(TO)PO(OH), wherein R represents an alcohol residue derived from an unsaturated polymerizable alcohol with 2-12 carbon atoms or wherein R represents a group A-B where A represents a residual acid derived from an unsaturated polymerizable carboxylic acid with 3-25 carbon atoms and B represents a bivalent residue derived from a diol, and wherein TO represents a residue derived from a branched or non-branched aliphatic alcohol with 6-22 carbon atoms or from a polyoxyalkylated alkylphenol with 7-30 carbon atoms or from an addition product of ethylene oxide to an alcohol with 6-22 carbon atoms or from an addition product of an alkylene oxide containing at least 3 carbon atoms to an alcohol with 1-15 carbon atoms and

d. 0-0.3% (wt) organic unsaturated mono and/or dicarboxylic acid.

The result is that pigment particles and colourant particles coated with a plastic dispersion are obtained that can be mixed with a plurality of plastics without agglomerates being formed.

The plastic dispersion is preferably a dispersion of a polymer based on

a. 50-99% (wt) vinyl monomer,

b. 0-50% (wt) (C_1-C_{12}) alkyl (meth)acrylate, (C_1-C_{12}) dialkylitaconate, (C_1-C_{12}) dialkylfumarate and/or (C_1-C_{12}) dialkylmaleate,

c. 0,1-5% (wt) of a phosphorus-containing compound according to any one of the formulas $(RO)_2PO(OH)$ and/or $(RO)PO(OH)_2$, wherein R represents an alcohol residue derived from an unsaturated polymerizable alcohol with 2-12 carbon atoms or where R represents a group A-B, where A represents a residual acid derived from an unsaturated polymerizable carboxylic acid with 3-25 carbon atoms from the group formed by acrylic acid, methacrylic acid, crotonic acid, monoesterified fumaric acid, monoesterified maleic acid and monoesterified itaconic acid and where B represents a bivalent residue derived from a diol and/or a phosphorus-containing compound according to the formula (RO)(TO)PO(OH), where R represents an alcohol residue derived from an unsaturated polymerizable alcohol with 2-12 carbon atoms or wherein R represents an AB group where A is a residual acid derived from an unsaturated polymerizable carboxylic acid with 3-25 carbon atoms and B represents a bivalent residue derived from a diol, and wherein TO represents a residue derived from a branched or non-branched aliphatic alcohol with 6-22 carbon atoms or from a polyoxyalkylated alkylphenol with 7-30 carbon atoms or from an addition product of ethylene oxide to an alcohol with 6-22 carbon atoms or from an addition product of an alkylene oxide containing at least 3 carbon atoms to an alcohol with 1-15 carbon atoms and

d. 0-0.3% (wt) organic unsaturated mono and/or dicarboxylic acid.

The vinyl monomer can, for instance, be a vinylaromatic monomer, vinylacetate, vinylversatate, vinyllaurate or vinylcaprate. Preference is given to the use of a vinylaromatic monomer, for instance, styrene. Other suitable vinylaromatic monomers include vinyltoluene and methylstyrene.

The preferred component (b) is (C_1-C_{12}) alkyl (meth)acrylate.

(C_1-C_{12}) alkyl (meth)acrylate is preferably methyl (meth)acrylate. Other suitable (C_1-C_{12}) alkyl (meth)-acrylates include for example ethyl (meth)acrylate, butyl (meth)acrylate and 2-ethyl-hexyl (meth)acrylate.

Phosphorus-containing compounds according to any one of the formulas $(RO)_2PO(OH)$ and/or $(RO)PO(OH)_2$ are preferably used as component (c).

According to a preferred embodiment of the invention, the percentage by weight of organic unsaturated mono or dicarboxylic acid is substantially 0% (wt). If organic unsaturated mono or dicarboxylic acid is present, it is preferably (meth)acrylic acid.

In formulas $(RO)_2PO(OH)$ and $(RO)PO(OH)_2$ the RO group may be derived from an unsaturated polymerizable alcohol with 2-12 carbon atoms such as, for instance, allyl alcohol, crotyl alcohol, undecylene alcohol or cinnamyl alcohol. The RO group may further represent an A-B-O group wherein A is a residual acid derived from an unsaturated polymerizable carboxylic acid with 3-25 carbon atoms and wherein B is a residue derived from a bivalent alcohol. Suitable carboxylic acids include acrylic acid, methacrylic acid and crotonic acid. Also monoesters of a dicarboxylic acid such as, for instance, fumaric acid, maleic acid or itaconic acid and an alcohol with 1-20 carbon atoms such as, for instance, methanol, ethanol, propanol, butanol, heptanol, 2-ethylhexanol, decanol, tridecanol, cyclohexanol or benzyl alcohol are suitable. Examples of bivalent alcohols are the branched or non-branched aliphatic or cycloaliphatic diols with 2-20 carbon atoms such as, for instance, ethylene glycol, propylene glycol, 1,4-butanediol, 1,2-butanediol, 1,2-hexanediol, 1,2-decanediol, 1,2-dodecanediol and 1,4-bis(hydroxymethyl)cyclo-hexane. Other suitable bivalent alcohols are the polyoxyalkylene glycols with (2-100) units derived from ethylene glycol, propylene glycol, 1,2 butanediol or 1,4 butanediol such as, for instance, diethylene glycol, triethylene glycol, tetraethylene glycol, dipropylene glycol, tripropylene glycol, dibutylene glycol, tributylene glycol and higher polyoxyalkylene glycols.

Other suitable diols are diols containing an aromatic ring such as, for instance, 1,4-bis(hydroxymethyl)-benzene and hydroxy-terminal polylactones with molecular weights of between 200 and 1000 such as, for instance, polycaprolactone.

The phosphorus-containing compounds are preferably compounds according to formulas $(ABO)_2PO(OH)$ and/or $(ABO)PO(OH)_2$, where A is derived from acrylic acid, methacrylic acid or crotonic acid and B is derived from a branched or non-branched bivalent aliphatic alcohol with (2-6) carbon atoms. Examples are the mono-di-phosphate esters of hydroxyethyl (meth)acrylate, hydroxyethyl crotonate, 4-hydroxybutyl (meth)acrylate and 4-hydroxybutyl crotonate.

Preference is given to the use of reaction products of hydroxyethyl (meth)acrylate with P_2O_5 or to reaction products of hydroxyethyl (meth)acrylate and (1-10) ethylene oxide units or (1-6) propylene oxide units with P_2O_5.

In formula (RO)(TO)PO(OH) the TO residue may be derived from an aliphatic monoalcohol with 6-22 carbon atoms such as, for instance, hexanol, n-octanol, capryl alcohol, lauryl alcohol, cetyl alcohol, isotridecyl alcohol or octadecyl alcohol. The TO residue may also be derived from a polyoxyalkylated alkylphenol with 7-30 carbon atoms, or from a polyoxyalkylated higher alcohol with 6-22 carbon atoms. Examples of these are the condensation products with 1-40 moles ethylene oxide with 1 mole nonylphenol, dibutylphenol, dodecylphenol or dioctylphenol, or lauryl alcohol, n-octanol and tridecyl alcohol. The TO-residue may further be derived also from a block copolymer of ethylene oxide with propylene oxide etherified at one end with a hydrocarbon residue with 1-15 carbon atoms or from such a monoetherified polypropylene glycol or other polyoxyalkylene glycol in which the oxyalkylene units contain at least 3 carbon atoms, for instance monomethoxyheptapropylene glycol.

TO is preferably derived from a higher alcohol or from a polyethylene oxide adduct of an alcohol or alkylphenol.

The RO group may be derived from a polymerizable unsaturated alcohol, such as for example allyl alcohol, crotonyl alcohol, cinnamyl alcohol, undecylene alcohol and vinyl alcohol. The RO group is preferably derived from a hydroxyalkyl ester or polyoxyalkylene ester of a polymerizable unsaturated carboxylic acid with 3-25 carbon atoms, such as acrylic acid, methacrylic acid or crotonic acid, or a monoester of maleic acid, fumaric acid or itaconic acid with an aliphatic alcohol containing 1-20 carbon atoms, such as methanol, ethanol, butanol and hexanol.

Herein B is a bivalent residue derived from a diol. The diol may be a branched or non-branched aliphatic or cycloaliphatic diol with 2-20 carbon atoms or a polyoxyalkylenediol with 2-100, preferably 2-10, units derived from ethylene glycol, propylene glycol, 1,2-butylene glycol and 1,4-butylene glycol.

The diol may also contain aromatic groups or be a hydroxyl-terminal polylactone with a molecular weight of between 200 and 1000. The diol may, for instance, be ethylene glycol, propanediol 1,2, propanediol 1,3, butanediol 1,4, butanediol 1,2, decanediol 1,2, dodecanediol 1,2, hexanediol 1,5, 1,4-bis-(hydroxylmethyl)-cyclohexane, 1,4-bis(hydroxymethyl)benzene, hexanediol 1,2, diethylene glycol, triethylene

glycol, dipropylene glycol, tetrapropylene glycol, dibutylene glycol, a higher polyoxyalkylene glycol and polycaprolactonediol. Preference is given to the use of emulsifiers with the formula (RO)(TO)PO(OH), wherein RO is derived from a hydroxyalkyl ester of acrylic acid, methacrylic acid or crotonic acid, in which the branched or non-branched alkyl group has 2-6 carbon atoms, in the form of a reaction product as described above.

The phosphorus-containing compounds used as component c) can be obtained according to the processes described in US-A-4110285 and US-A-4101490.

The plastic dispersions may be aqueous as well as non-aqueous dispersions. Preference is given to the use of aqueous dispersions.

The plastic dispersions can be obtained by means of emulsion polymerizations known in the art.

The molecular weights of the polymers in the dispersions can be analyzed by means of gas phase chromatography (GPC) in which analyses the polymers are dissolved in tetrahydrofuran and filtered off over an 0.45 micrometer filter.

Three linear columns are used with polystyrene as standard. The dispersions normally show a virtually gaseous molecular weight distribution, the distribution being asymmetric with a range between 25,000 and 150,000 g/mole for the top of the greatest peak (calibrated with respect to narrow polystyrene standards). If the molecular weight is too high, the miscibility of the dispersion-coated pigment in plastics may be insufficient. In order to obtain the desired molecular weights, chain regulators such as, for instance, dodecyl mercaptan, carbon tetrachloride, n-butyl mercaptan and 2-mercaptoethanol may be necessary.

The plastic dispersion is mixed with a pigment paste in a ball mill or in a high-speed mixer. In such an aqueous paste the pigment is contained in a finely distributed state with the desired particle size, which is preferably smaller than 5 µm. The mixture consisting of dispersion and pigment paste can be dried by spray drying to form a pigment powder. The mixture consisting of dispersion and pigment paste can also be heated, causing coagulation. If necessary, the resulting product will be filtered, washed, dried and/or ground. In this manner a particle coated with a plastic dispersion can be obtained.

The amount of pigment by weight (calculated on the amount of dispersion by weight) may vary within wide limits. The amount of pigment usually varies between 10 and 90% (wt) calculated on the total amount of coated pigment by weight. If inorganic pigments are used, these amounts are typically 50-75% (wt) pigment and 25-50% (wt) dispersion. If organic pigments are used, these amounts are normally 25-35% (wt) pigment and 65-75% (wt) dispersion.

If so desired, additives such as, for instance, metallic soaps, low-molecular polymers, waxes and/or liquid esters of dicarboxylic acids may be used also in order to obtain substantially dust-free, easy-to-use and easy-to-meter products (masterbatches). Examples of suitable metallic soaps are magnesium-, calcium- and zinc stearate. Examples of suitable liquid esters of dicarboxylic acids are the esters of aromatic dicarboxylic acids such as dioctylphthalate. Other suitable additives are, for instance, stearylamide, ethylenedistearyl-amide, silica, hydrogenated castor oil and/or esters of pentaerythriotol such as a monoester or tetraester of pentaerythritol, for instance an ester of a fatty acid with 12 to 18 carbon atoms. The above additives are described, for instance, in EP-A-290092 and EP-A-379751.

The amount of coated pigment particles or colourant particles ranges between about 0.1 and 20% by weight calculated on the plastic. Suitable plastics are, for instance, polystyrene, ABS, PVC, polyesters, polyethylene, polypropylene, polycarbonate and polyethylene terephthalate.

The invention also comprises the mixtures based on these plastics and the coated organic and inorganic particles.

The pigments and colourants coated according to the invention can be used in the production of powder coatings, rubbers, pharmaceutical products, paints, products in the food industry, printing inks, films and laminates.

The pigment particles and colourant particles may be of an organic as well as an inorganic nature. The particle size is mostly between 0,01 µm and 100 µm. Examples of suitable inorganic pigments include TiO_2, ZnO, Sb_2O_3, ZrO, $BaSO_4$/ZnS, TiO_2/$CaSO_4$, TiO_2/$BaSO_4$, Pb_3O_4, CdS(Se), Sb_2S_3, HgS, $PbCrO_4$, $Pb(OH)_2$, $BaCrO_4$, $SrCrO_4$, $PbCrO_4$, PbO, Cr_2O_3, $(CO_3(PO_4)_2$, $Fe_4((Fe(CN)6)_3$, CaO.CuO.4 SiO_2, CuO.Al_2O_3, 'metallic' pigment and carbon black.

Suitable organic pigments include azo compounds and ultramarine blue.

Suitable pigments and colourants are described, for instance, in EP-A-104498.

The invention is elucidated by means of the following non-restrictive examples.

Example I

Preparation of a plastic dispersion

A flask (of 2 litres) provided with a cooler, thermocoupler and stirrer was filled with 62 parts by weight demineralized water and 0.04 parts by weight sodium dodecylbenzenesulphonate.

This mixture was brought to 80 °C.

Subsequently were added 0.35 part by weight ammoniumpersulphate as initiator and as a pre-emulsion 99 parts by weight styrene, 0.15 part by weight dodecyl mercaptan, 3.5 parts by weight sodium dodecylbenzenesulphonate, 1 part by weight mono-di-phosphate ester of hydroxyethyl (meth)acrylate and 30 parts by weight demineralized water.

After metering the pre-emulsion for three hours the temperature was raised to 85 °C, while simultaneously metering for one hour a solution of 0.15 grams ammonium persulphate in 3.1 grams demineralized water. After 2 hours at 85 °C the flask was cooled, filtered and drained.

Example II

The process according to Example I was repeated, with 15 parts by weight methyl methacrylate and 84 parts by weight styrene being incorporated instead of 99 parts by weight styrene.

Example III

The process according to Example I was repeated, with 25 parts by weight butyl acrylate and 74 parts by weight styrene being incorporated instead of 99 parts by weight styrene.

Comparative Experiment A

The process according to Example I was repeated, with 2 parts by weight acrylic acid and 97 parts by weight styrene being incorporated instead of 99 parts by weight styrene.

Comparative Experiment B

The process according to Example I was repeated, with 3 parts by weight methacrylic acid and 96 parts by weight styrene being incorporated instead of 99 parts by weight styrene.

Table I

Dispersion according to Example	I	II	III	A	B
	parts by weight				
demineralized water	62	62	62	62	62
sodium dodecylbenzenesulphonate	0.04	0.04	0.04	0.04	0.04
styrene	99	84	74	97	96
methyl methacrylate		15			
butyl acrylate			25		
acrylic acid				2	
methacrylic acid					3
dodecyl mercaptan	0.15	0.15	0.15	0.15	0.15
sodium dodecylbenzenesulphonate	3.5	3.5	3.5	3.5	3.5
mono-di-phosphate ester of hydroxylethyl methacrylate	1	1	1	1	1
demineralized water	30	30	30	30	30

Example IV

Preparation of a pigment paste

3.85 parts by weight propylene glycol, 1.40 parts by weight water, 0.85 part by weight dispersant (Orotan 731 SD^R, 25% solution, Rohm and Haas), 0.10 part by weight dispersant (Surfynol 104E^R, Air Products), 0.10 part by weight antifoamer (Agitan 703^R, Munzing Chemie) and 19.70 parts by weight titanium dioxide (Kronos 2190^R, Kronos Titan) were mixed and, using a ball mill or pearl mill, ground to a Hegman fineness lower than 5 (ASTM-D-1210-79).

Example V

Preparation of a pigment paste

125 parts by weight water, 20 parts by weight ethylene glycol, 45 parts by weight dispersant (SER AD FA^R 620, Servo) and 235 parts by weight pigment (Helio Blue 6900^R) were brought to the required particle size by means of a ball mill. 200 parts by weight styrene-acrylate dispersion (50% water), 5 parts by weight calciumstearate dispersion (50% water) and 25 parts by weight 2% by weight aqueous hydroxyethyl cellulose solution were added to the above mixture and well stirred. This pigment paste was subjected to spray drying and contained 65% by weight pigment (Helio Blue) (dry on dry).

Example VI

50 parts by weight of 50% aqueous solutions of the plastic dispersions according to Examples I-III and Comparative Experiments A-B were mixed in a high-speed mixer with 83 parts by weight pigment paste according to Example IV. The result was that TiO_2 was coated with the dispersion.

Example VII

10 parts by weight of the TiO_2 coated according to Example VI were mixed in an extruder with 20 parts by weight polycarbonate.

After a visual determination it was found that TiO_2 coated with dispersions according to any one of examples I-III showed a good homogeneous distribution in the polycarbonate. On the other hand, the experiments based on TiO_2 coated with dispersions according to any one of Comparative Experiments A-B showed many agglomerates.

Example VIII

50 parts by weight of 50% aqueous solutions of plastic dispersions according to Examples I-III and Comparative Experiments A-B were mixed in a high-speed mixer with 106 parts by weight of this pigment paste according to Example V, 1.25 parts by weight calcium stearate 50% and 6.25 parts by weight 2% hydroxyethyl cellulose solution. The result was that the pigment was coated with the dispersions. Subsequently, this mixture was dried by spray drying to form a dust-free powder.

Example IX

10 parts by weight of the pigment coated according to Example VIII were mixed in an extruder at 150 °C with 200 parts by weight polystyrene.

After a visual determination, it was found that 'helio blue' coated with dispersions according to any one of Examples I-III showed a good homogeneous distribution in the polystyrene.

On the other hand, the experiments with 'helio blue' coated with dispersions according to any one of Comparative Experiments A-B showed many agglomerates.

Claims

1. Use of a plastic dispersion as coating for inorganic and organic particles, such as pigment particles and colourant particles, characterized in that the plastic dispersion is a dispersion of a polymer based on
   a. a vinyl monomer,

b. (C_1-C_{12}) alkyl (meth)acrylate, (C_1-C_{12}) dialkylitaconate, (C_1-C_{12}) dialkylfumarate and/or (C_1-C_{12}) dialkylmaleate,
c. a phosphorus-containing compound according to one of the formulas $(RO)_2PO(OH)$ and/or $(RO)PO(OH)_2$, wherein R represents an alcohol residue derived from an unsaturated polymerizable alcohol with 2-12 carbon atoms or wherein R represents a group A-B, where A represents a residual acid derived from an unsaturated polymerizable carboxylic acid with 3-25 carbon atoms from the group consisting of acrylic acid, methacrylic acid, crotonic acid, monoesterified fumaric acid, monoesterified maleic acid and monoesterified itaconic acid and where B represents a bivalent residue derived from a diol and/or a phosphorus-containing compound according to the formula (RO)(TO)PO(OH), wherein R represents an alcohol residue derived from an unsaturated polymerizable alcohol with 2-12 carbon atoms or wherein R represents a group A-B where A represents a residual acid derived from an unsaturated polymerizable carboxylic acid with 3-25 carbon atoms and B represents a bivalent residue derived from a diol, and wherein TO represents a residue derived from a branched or non-branched aliphatic alcohol with 6-22 carbon atoms or from a polyoxyalkylated alkylphenol with 7-30 carbon atoms or from an addition product of ethylene oxide to an alcohol with 6-22 carbon atoms or from an addition product of an alkylene oxide containing at least 3 carbon atoms to an alcohol with 1-15 carbon atoms and
d. 0-0.3% (wt) organic unsaturated mono and/or dicarboxylic acid.

2. Use according to claim 1, characterized in that the plastic dispersion is a dispersion of a polymer based on
a. 50-99% (wt) vinyl monomer,
b. 0-50% (wt) (C_1-C_{12}) alkyl (meth)acrylate, (C_1-C_{12}) dialkylitaconate, (C_1-C_{12}) dialkylfumarate and/or (C_1-C_{12}) dialkylmaleate,
c. 0,1-5% (wt) of a phosphorus-containing compound according to any one of the formulas $(RO)_2PO(OH)$ and/or $(RO)PO(OH)_2$; wherein R represents an alcohol residue derived from an unsaturated polymerizable alcohol with 2-12 carbon atoms or where R represents a group A-B, where A represents a residual acid derived from an unsaturated polymerizable carboxylic acid with 3-25 carbon atoms from the group formed by acrylic acid, methacrylic acid, crotonic acid, monoesterified fumaric acid, monoesterified maleic acid and monoesterified itaconic acid and where B represents a bivalent residue derived from a diol and/or a phosphorus-containing compound according to the formula (RO)(TO)PO(OH), where R represents an alcohol residue derived from an unsaturated polymerizable alcohol with 2-12 carbon atoms or wherein R represents an AB group where A is a residual acid derived from an unsaturated polymerizable carboxylic acid with 3-25 carbon atoms and B represents a bivalent residue derived from a diol, and wherein TO represents a residue derived from a branched or non-branched aliphatic alcohol with 6-22 carbon atoms or from a polyoxyalkylated alkylphenol with 7-30 carbon atoms or from an addition product of ethylene oxide to an alcohol with 6-22 carbon atoms or from an addition product of an alkylene oxide containing at least 3 carbon atoms to an alcohol with 1-15 carbon atoms and
d. 0-0.3% (wt) organic unsaturated mono and/or dicarboxylic acid.

3. Use according to any one of claims 1-2, characterized in that the % (wt) of organic unsaturated mono or dicarboxylic acid is substantially 0% (wt).

4. Use according to any one of claims 1-3, characterized in that the vinyl monomer is styrene.

5. Use according to any one of claims 1-4, characterized in that (C_1-C_{12}) alkyl (meth)acrylate is methyl (meth)acrylate.

6. Use according to any one of claims 1-5, characterized in that component c) is the phosphate ester of hydroxyethyl (meth)acrylate, hydroxyethyl crotonate, 4-hydroxybutyl (meth)acrylate or 4-hydroxybutyl crotonate.

7. Inorganic or organic particles coated with a plastic dispersion according to any one of claims 1-6.

8. Mixture based on a plastic and coated inorganic and organic particles as described in any one of claims 1-6.

Patentansprüche

1. Verwendung einer Kunststoffdispersion als Beschichtung für anorganische und organische Teilchen, wie Pigmentteilchen und Färbemittelteilchen, dadurch gekennzeichnet, daß die Kunststoffdispersion eine Dispersion eines Polymers ist auf Basis von:
   a) einem Vinylmonomer,
   b) C_1-C_{12}-Alkyl(meth)acrylat, C_1-C_{12}-Dialkylitaconat, C_1-C_{12}-Dialkylfumarat und/oder C_1-C_{12}-Dialkylmaleat,
   c) einer phosphorhaltigen Verbindung einer der Formeln $(RO)_2PO(OH)$ und/oder $(RO)PO(OH)_2$, worin R einen Alkoholrest, abgeleitet von einem ungesättigten polymerisierbaren Alkohol mit 2 bis 12 Kohlenstoffatomen, bedeutet, oder worin R eine Gruppe A-B darstellt, wobei A ein Säurerest, abgeleitet von einer ungesättigten polymerisierbaren Carbonsäure mit 3 bis 25 Kohlenstoffatomen aus der Gruppe bestehend aus Acrylsäure, Methacrylsäure, Crotonsäure, monoveresterter Fumarsäure, monoveresterter Maleinsäure und monoveresterter Itaconsäure, ist, und wobei B ein zweiwertiger Rest ist, abgeleitet von einem Diol und/oder einer phosphorhaltigen Verbindung der Formel (RO)(TO)PO(OH), worin R einen Alkoholrest, abgeleitet von einem ungesättigten polymerisierbaren Alkohol mit 2 bis 12 Kohlenstoffatomen, bedeutet, oder worin R eine Gruppe A-B darstellt, wobei A ein Säurerest, abgeleitet von einer ungesättigten polymerisierbaren Carbonsäure mit 3 bis 25 Kohlenstoffatomen, ist, und B ein zweiwertiger Rest ist, abgeleitet von einem Diol, und worin TO einen Rest, abgeleitet von einem verzweigten oder nicht-verzweigten aliphatischen Alkohol mit 6 bis 22 Kohlenstoffatomen oder von einem polyoxyalkylierten Alkylphenol mit 7 bis 30 Kohlenstoffatomen oder von einem Additionsprodukt von Ethylenoxid an einen Alkohol mit 6 bis 22 Kohlenstoffatomen oder von einem Additionsprodukt eines Alkylenoxids mit zumindest 3 Kohlenstoffatomen an einen Alkohol mit 1 bis 15 Kohlenstoffatomen, darstellt, und
   d) 0 bis 0,3 Masse-% organischer ungesättigter Mono- und/oder Dicarbonsäure.

2. Verwendung nach Anspruch 1, dadurch gekennzeichnet, daß die Kunststoffdispersion eine Dispersion eines Polymers ist auf Basis von:
   a) 50 bis 99 Masse-% Vinylmonomer,
   b) 0 bis 50 Masse-% C_1-C_{12}-Alkyl(meth)acrylat, C_1-C_{12}-Dialkylitaconat, C_1-C_{12}-Dialkylfumarat und/oder C_1-C_{12}-Dialkylmaleat,
   c) 0,1 bis 5 Masse-% einer phosphorhaltigen Verbindung irgendeiner der Formeln $(RO)_2PO(OH)$ und/oder $(RO)PO(OH)_2$, worin R einen Alkoholrest, abgeleitet von einem ungesättigten polymerisierbaren Alkohol mit 2 bis 12 Kohlenstoffatomen, bedeutet, oder worin R eine Gruppe A-B darstellt, wobei A ein Säurerest, abgeleitet von einer ungesättigten polymerisierbaren Carbonsäure mit 3 bis 25 Kohlenstoffatomen aus der Gruppe bestehend aus Acrylsäure, Methacrylsäure, Crotonsäure, monoveresterter Fumarsäure, monoveresterter Maleinsäure und monoveresterter Itaconsäure, ist, und wobei B ein zweiwertiger Rest ist, abgeleitet von einem Diol und/oder einer phosphorhaltigen Verbindung der Formel (RO)(TO)PO(OH), worin R einen Alkoholrest, abgeleitet von einem ungesättigten polymerisierbaren Alkohol mit 2 bis 12 Kohlenstoffatomen, bedeutet, oder worin R eine AB-Gruppe darstellt, wobei A ein Säurerest, abgeleitet von einer ungesättigten polymerisierbaren Carbonsäure mit 3 bis 25 Kohlenstoffatomen, ist, und wobei B ein zweiwertiger Rest ist, abgeleitet von einem Diol, und worin TO einen Rest, abgeleitet von einem verzweigten oder nicht-verzweigten aliphatischen Alkohol mit 6 bis 22 Kohlenstoffatomen oder von einem polyoxyalkylierten Alkylphenol mit 7 bis 30 Kohlenstoffatomen oder von einem Additionsprodukt von Ethylenoxid an einen Alkohol mit 6 bis 22 Kohlenstoffatomen oder von einem Additionsprodukt eines Alkylenoxids mit zumindest 3 Kohlenstoffatomen an einen Alkohol mit 1 bis 15 Kohlenstoffatomen, darstellt, und
   d) 0 bis 0,3 Masse-% organischer ungesättigter Mono-und/oder Dicarbonsäure.

3. Verwendung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Masseprozentsatz organischer Mono- und/oder Dicarbonsäure im wesentlichen Null ist.

4. Verwendung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß das Vinylmonomer Styrol ist.

5. Verwendung nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß C_1-C_{12}-Alkyl(meth)acrylat Methyl(meth)acrylat ist.

6. Verwendung nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Komponente c) der Phosphatester von Hydroxyethyl(meth)acrylat, Hydroxyethylcrotonat, 4-Hydroxybutyl(meth)acrylat, oder 4-Hydroxybutylcrotonat ist.

7. Anorganische oder organische Teilchen, welche mit einer Kunststoffdispersion nach einem der Ansprüche 1 bis 6 beschichtet sind.

8. Mischung auf Basis eines Kunststoffs und beschichteter anorganischer und organischer Teilchen, wie in einem der Ansprüche 1 bis 6 beschrieben.

Revendications

1. Utilisation d'une dispersion de matière plastique pour enrober des particules minérales et organiques telles que des particules de pigment et des particules colorantes, caractérisée en ce que la dispersion de matière plastique est une dispersion d'un polymère à base de :
   a. un monomère vinylique,
   b. un (meth)acrylate d'alkyle en C_{1-12}, un dialkylitaconate en C_{1-12}, un dialkylfumarate en C_{1-12} et/ou un dialkylmaléate en C_{1-12},
   c. un composé contenant du phosphore selon l'une des formules $(RO)_2PO(OH)$ et/ou $(RO)PO(OH)_2$, dans lesquelles R représente un reste d'alcool dérivé d'un alcool insaturé polymérisable de 2 à 12 atomes de carbone ou dans lesquelles R représente un groupe A-B dans lequel A est un acide résiduel dérivé d'un acide carboxylique polymérisable insaturé de 3 à 25 atomes de carbone venant du groupe consistant en acide acrylique, méthacrylique, crotonique, acide fumarique monoestérifié, acide maléique monoestérifié et acide itaconique monoestérifié et B représente un reste divalent dérivé d'un diol et/ou un composé contenant du phosphore selon la formule (RO)(TO)PO(OH), dans laquelle R représente un reste d'alcool dérivé d'un alcool polymérisable insaturé de 2 à 12 atomes de carbone ou R représente un groupe A-B dans lequel A est un acide résiduel dérivé d'un acide carboxylique polymérisable insaturé de 3 à 25 atomes de carbone et B représente un reste divalent dérivé d'un diol, et TO représente un reste dérivé d'un alcool aliphatique ramifié ou non ramifié contenant de 6 à 22 atomes de carbone ou d'un alkylphénol polyoxyalkylé de 7 à 30 atomes de carbone ou d'un produit d'addition de l'oxyde d'éthylène à un alcool de 6 à 22 atomes de carbone ou d'un produit d'addition d'un oxyde d'alkylène contenant au moins 3 atomes de carbone à un alcool de 1 à 15 atomes de carbone, et
   d. de 0 à 0,3% en poids d'un acide insaturé mono et/ou di-carboxylique.

2. Utilisation selon la revendication 1, caractérisée en ce que la dispersion de matière plastique est une dispersion d'un polymère à base de :
   a. 50 à 99% en poids d' un monomère vinylique,
   b. 0 à 50% en poids d' un (meth)acrylate d'alkyle en C_{1-12}, un dialkylitaconate en C_{1-12}, un dialkylfumarate en C_{1-12} et/ou un dialkylmaléate en C_{1-12},
   c. 0,1 à 5% en poids d'un composé contenant du phosphore selon l'une des formules $(RO)_2PO(OH)$ et/ou $(RO)PO(OH)_2$, dans lesquelles R représente un reste d'alcool dérivé d'un alcool insaturé polymérisable de 2 à 12 atomes de carbone ou dans lesquelles R représente un groupe A-B dans lequel A est un acide résiduel dérivé d'un acide carboxylique polymérisable insaturé de 3 à 25 atomes de carbone venant du groupe consistant en acide acrylique, méthacrylique, crotonique, acide fumarique monoestérifié, acide maléique monoestérifié et acide itaconique monoestérifié et B représente un reste divalent dérivé d'un diol et/ou un composé contenant du phosphore selon la formule (RO)(TO)PO(OH), dans laquelle R représente un reste d'alcool dérivé d'un alcool polymérisable insaturé de 2 à 12 atomes de carbone ou R représente un groupe A-B dans lequel A est un acide résiduel dérivé d'un acide carboxylique polymérisable insaturé de 3 à 25 atomes de carbone et B représente un reste divalent dérivé d'un diol, et TO représente un reste dérivé d'un alcool aliphatique ramifié ou non ramifié contenant de 6 à 22 atomes de carbone ou d'un alkylphénol polyoxyalkylé de 7 à 30 atomes de carbone ou d'un produit d'addition de l'oxyde d'éthylène à un alcool de 6 à 22 atomes de carbone ou d'un produit d'addition d'un oxyde d'alkylène contenant au moins 3 atomes de carbone à un alcool de 1 à 15 atomes de carbone, et
   d. de 0 à 0,3% en poids d'un acide insaturé mono et/ou di-carboxylique.

3. Utilisation selon l'une quelconque des revendications 1 ou 2, caractérisée en ce que le pourcentage (en poids) de l'acide organique insaturé mono ou dicarboxylique est essentiellement 0% (en poids).

4. Utilisation selon l'une quelconque des revendications 1 à 3, caractérisée en ce que le monomère vinylique est le styrène.

5. Utilisation selon l'une quelconque des revendications 1 à 4, caractérisée en ce que le (meth)acrylate d'alkyle en C_{1-12} est le (meth)acrylate de méthyle.

6. Utilisation selon l'une quelconque des revendications 1 à 5, caractérisée en ce que le composant c) est le phosphate de (meth)acrylate d'hydroxyéthyle, crotonate d'hydroxyéthyle, (meth)acrylate de 4-hydroxybutyle ou crotonate de 4-hydroxybutyle.

7. Particules minérales ou organiques enrobées d'une dispersion de matière plastique selon l'une quelconque des revendications 1 à 6.

8. Mélange à base d'une matière plastique et de particules minérales ou organiques enrobées comme décrit dans l'une quelconque des revendications 1 à 6.